Pregnancy Intention, Demographic Differences, and Psychosocial Health

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Abstract

Objectives: We explore the psychosocial, demographic, and maternal characteristics across wanted, mistimed, and unwanted pregnancies.

Methods: Data from 1321 women from a prospective cohort study of pregnant women in Durham, NC, are analyzed. Psychosocial correlates were obtained through prenatal surveys; electronic medical records were used to ascertain maternal health and pregnancy outcomes.

Results: Sixty-two percent of the women indicated an unintended pregnancy, with 44% (578) mistimed and 18% (245) unwanted. Only 38% of the pregnancies were characterized as wanted. Women with unwanted and with mistimed pregnancies were similar demographically, but they differed significantly on psychosocial profiles and maternal characteristics. Women with mistimed and with wanted pregnancies differed in demographics and psychosocial profiles. Wanted pregnancies had the healthiest, mistimed an intermediate, and unwanted the poorest psychosocial profile. Women with unwanted pregnancies had the highest depression, perceived stress, and negative paternal support scores ($p < 0.05$) and the lowest self-efficacy, social support, and positive paternal support scores ($p < 0.05$). In multivariate analyses, women with riskier psychosocial profiles had higher odds of being in the unwanted category. Controlling for psychosocial and demographic variables, perceived stress and positive paternal support remained significant predictors of belonging to the unwanted and mistimed groups.

Conclusions: Fully characterizing pregnancy intention and its relationship to psychosocial profiles may provide a basis for identifying women with highest risk during pregnancy and early motherhood. Women with unwanted and mistimed pregnancies may appear similar demographically but are different psychosocially. Women with unwanted pregnancies have multiple risk factors and would benefit from targeted interventions.

Introduction

DESPITE THE HEALTHY PEOPLE 2010 GOAL of decreasing unintended pregnancies to 30%, the United States experiences consistently high rates, ranging from 40% to 65%.[1–3] Unintended pregnancy remains a vital public health issue, as it has been associated with delayed and inadequate prenatal care,[4,5] higher rates of low birth weight and preterm birth infants,[4–9] infant mortality,[5,7] risky behaviors during pregnancy,[10–12] maternal morbidity and mortality,[4,13] and increased medical costs.[14]

Pregnancy intention varies by demographic characteristics, with unintended pregnancies reported more often in women who are black,[13,15,16] unmarried,[13,15,16] less educated,[13,15,16] and enrolled in Medicaid.[16] In one study, women without high school diplomas were three times more likely to have an unintended pregnancy than women with college degrees.[1] Importantly, although the proportion of unintended preg-

nancies is highest among teens, women aged ≥20 account for the largest number of unintended pregnancies.[1,17] These demographic characteristics have been linked, independent of intention, to adverse pregnancy outcomes,[18–20] and the relationship between pregnancy intention and birth outcomes attenuates in some cases after adjusting for maternal socioeconomic variables.[15,21] An unintended pregnancy may be an additional stressor during pregnancy and may modify a woman's psychosocial health, contributing to the risk of adverse outcomes.

As the rates for unintended pregnancy have remained high despite multiple and varied intervention strategies,[1,22,23] researchers have incorporated a more nuanced definition of intention to better understand the problem and thus design more effective intervention programs.[4,13,24–28] Conventionally, the literature has divided pregnancy into two categories: intended and unintended.[15,29] This dichotomous classification combines mistimed and unwanted pregnancies into one category,

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unintended. A mistimed pregnancy may be inherently different from an unwanted pregnancy. For example, D'Angelo et al.[24] found that the majority of births (57%) were intended. When the 43% unintended category was broken down, however, 32% of births were mistimed, leaving 11% of the births unwanted. Women who report an unwanted pregnancy often are older than women who report a mistimed pregnancy,[16,24] suggesting that the context of an unwanted pregnancy likely differs from the context of a mistimed pregnancy. Therefore, it may not be valid to combine these two categories.

Psychosocial health has been found to differ among intention status. Although the work on psychosocial health is still relatively new,[5] Orr and Miller[30] were at the forefront over a decade ago, comparing psychosocial health among women with wanted, mistimed, and unwanted pregnancies. They found that women with unwanted pregnancies had the highest levels of depression and exposure to stress and the lowest levels of support. Women with mistimed pregnancies were intermediate between women with unwanted and wanted pregnancies. Urging cautious interpretation, Orr and Miller emphasize the risks of unwanted and mistimed pregnancies to the well-being of these women. Similarly, in more recent research, women with unintended pregnancies have reported higher levels of depression,[16,31,32] higher levels of stress,[32] and lower levels of well-being.[33]

This current work complements the existing literature on pregnancy intention by focusing on demographic and psychosocial profiles, with an emphasis on whether these profiles differ across intention status, particularly unwanted and mistimed pregnancies. We define the psychosocial profile as the constellation of depression, self-efficacy, paternal support, social support, and perceived stress, an indicator of psychosocial health involving strengths and strains. We use an ongoing prospective cohort study of pregnant women in Durham County, NC, and categorize intention as wanted, mistimed, or unwanted. This allows for more systematic comparisons across maternal subgroups, including an analysis of whether mothers with mistimed vs. unwanted pregnancies constitute different subgroups.

Materials and Methods

The Healthy Pregnancy, Healthy Baby Study is an ongoing prospective cohort study designed to examine the effects of environmental, social, and host factors on racial disparities in pregnancy outcomes. The study, part of the U.S. Environmental Protection Agency (USEPA)-funded Southern Center on Environmentally Driven Disparities in Birth Outcomes (SCEDDBO), enrolls pregnant women from the Duke Obstetrics Clinic and the Durham County Health Department Prenatal Clinic. Women receiving prenatal care at these sites were eligible to participate if they were at least 18 years of age, English literate, between 18 and 28 weeks of gestation at study enrollment, lived in Durham County, were planning on delivering at Duke University Medical Center, and did not have a multiple gestation or any known fetal genetic or congenital abnormalities.

Demographic, health behavior, and medical history data were obtained by direct patient interview and through electronic medical record review at the time of enrollment. Information on events of the pregnancy, labor and delivery, and health of the neonate were ascertained from maternal and neonatal electronic medical records. Psychosocial profiles were assessed through a variety of survey instruments given between 18 and 28 weeks gestation, including the Fragile Families and Child Well-Being Survey,[34] the Perceived Stress Scale (PSS),[35] the Interpersonal Support Evaluation List (ISEL),[36] the Centers for Epidemiologic Studies Depression Scale (CES-D),[37] and the Jerusalem and Schwarzer instrument for assessing self-efficacy.[38]

Pregnancy intention

Pregnancy intention was assessed with a module developed by the Centers for Disease Control and Prevention (CDC) in its Pregnancy Risk Assessment Monitoring System (PRAMS) study.[39] This question asks the mother to think back to just before she became pregnant with this child and indicate how she felt about becoming pregnant. Response choices include wanting to become pregnant sooner, later, at that time, or not at all. We combined responses indicating wanting to become pregnant sooner and at that time as wanted. We classified later as mistimed and not at all as unwanted.

CES-D scale

Depression was assessed using the CES-D scale.[37] Designed for use in nonpsychiatric samples from the general population, it has excellent psychometric properties.

Fragile Families Survey

The relationship with the biological father was assessed with a battery of questions taken from the Fragile Families and Child Well-Being Survey.[34] The module assesses the amount of supportiveness and conflict present in the relationship. In a nationally representative survey, these measures were significant predictors of marital and romantic status.[40] Positive paternal support comprises understanding, affection, listening, and empathy. Negative paternal support comprises critical, controlling, and abusive behaviors.

Perceived Stress Scale

The PSS assesses subjective experience of stress.[21] PSS items tap the degree to which individuals feel that events in their lives are unpredictable and uncontrollable. Comparisons of the 10-item version with the original 14-item version of the scale reveal that the shorter version is psychometrically superior; Cronbach's alpha reliability was 0.78.

Interpersonal Support Evaluation List

The ISEL[22] is used to assess several dimensions of social support, including self-esteem, tangible social support, belonging, and satisfaction with supports; Cronbach's alpha was between 0.80 and 0.89.

Self-Efficacy Scale

Self-efficacy is measured using the 10-item Jerusalem and Schwarzer General Self-Efficacy Scale. This module measures how well respondents can cope with daily hassles and their ability to adapt to stressful circumstances; Cronbach's alpha for this module ranges from 0.76 to 0.90.[38]

This analysis includes women enrolled between study inception in June 2005 and September 2010. Of the 1743 women

enrolled in the study, 85 were excluded from analysis because they did not report pregnancy intention. An additional 155 women were excluded because of missing data on at least one demographic covariate (race, age, education, income, marital status). Because there were small numbers of Hispanics and Asians, we restricted this analysis to non-Hispanic black (NHB) (oversampling intentional) and non-Hispanic white (NHW) women. Thus, 1321 women were included in these analyses.

Analysis of variance (ANOVA) was run to compare the three groups in terms of demographics, psychosocial profiles, and pregnancy outcomes. In addition, multivariate analyses controlling for demographic characteristics previously found to be related to pregnancy intention were performed with multinomial logistic regression. The Healthy Pregnancy, Healthy Baby Study and all associated analyses are conducted according to a research protocol approved by Duke's Institutional Review Board. All analyses were run using STATA 10 (StataCorp, College Station, TX).

Results

Sample characteristics

Demographic characteristics of the sample can be found in Table 1. The sample is predominantly low income, with 51% of the women reporting annual incomes of <$20,000. In addition, 77% of the sample are NHB, 72% are single, and 73% are on Medicaid or are without health insurance. The mean age of women enrolled in the study is 26.2 years, with 45% of the sample <age 25. Sixty-two percent of the women indi-

cated that the pregnancy was unintended, with 44% (578) mistimed and 18% (245) unwanted. Only 38% of the pregnancies were characterized as wanted.

Demographic differences across intention categories

Significant demographic differences exist across the three intention categories (Table 1). Women who reported an unwanted pregnancy were more likely than those who reported a wanted pregnancy to have lower incomes, be NHB, have lower educational attainment, be single, and have three or more children. Whereas the demographic differences were pronounced between the unwanted and wanted categories, the unwanted and mistimed groups were similar on most demographic characteristics. The unwanted and mistimed groups were not statistically different on percent NHB, income, marital status, or education. The only statistically significant demographic differences between the unwanted and mistimed groups were that women with mistimed pregnancies were younger and less likely to have three or more children than the unwanted category. Women with wanted pregnancies were significantly more likely to be married and less likely to be NHB and have higher incomes and educational attainment than either of the other two groups ($p < 0.0001$).

Maternal characteristics across intention categories

Maternal characteristics played an important role in pregnancy intention as well (Table 2). Compared to women who

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF STUDY POPULATION

	All		Unwanted		Mistimed		Wanted	
	n	%	n	%	n	%	n	%
Overall	1321		245	18	578	44	498	38
Race								
NHW	303	22.9	14	5.7[a]	98	17.0[a]	191	38.0[c]
NHB	1018	77.1	231	94.3[a]	480	83.0[b]	307	61.7[c]
Age, years								
<20	176	13.3	27	11.0[a]	113	20.0[b]	36	7.2[a]
20–24	422	32.0	65	26.5[a]	242	41.9[b]	115	23.1[a]
25–29	316	23.9	70	28.6[a]	130	22.5[a]	116	23.3[a]
30–34	238	18.0	49	20.0[a]	69	11.9[b]	120	24.1[a]
≥35	139	10.5	28	11.4[a]	21	3.6[b]	90	18.1[c]
Education								
<High school	169	12.8	42	17.1[a]	78	13.5[a,b]	49	9.8[b]
Completed high school	489	37.0	100	40.8[a]	242	41.9[a]	147	29.5[b]
>High school	663	50.2	103	42.0[a]	258	44.6[a]	302	45.6[b]
Marital status								
Single	945	71.5	211	86.1[a]	474	82.0[a]	260	52.2[b]
Married	376	28.5	34	13.9[a]	104	18.0[a]	238	47.8[b]
Yearly household income								
<$20,000	674	51.0	157	64.1[a]	338	58.5[a]	179	35.9[b]
$20,000–$39,999	339	25.7	66	26.9[a]	163	28.2[a]	110	22.1[a]
≥$40,000	308	23.3	22	9.0[a]	77	25.0[a]	209	42.0[b]
Parity								
<3 children	1163	88.0	182	74.3[a]	529	91.5[b]	452	90.8[b]
≥3 children	158	12.0	63	25.7[a]	49	8.5[b]	46	9.2[b]

[a,b,c]Letters indicate significant differences ($p < 0.05$). Groups with the same letter are not significantly different. Groups with differing letters are significantly different from each other.

NHB, non-Hispanic black; NHW, non-Hispanic white.

TABLE 2. MATERNAL CHARACTERISTICS ACROSS INTENTION STATUS

	All n = 1321	Unwanted n = 245	Mistimed n = 578	Wanted n = 498
Medicaid or no insurance	911 (74%)	205 (89%)[a]	453 (85%)[a]	253 (54%)[b]
Previous preterm birth	234 (23%)	64 (26%)[a]	88 (19%)[b]	82 (16%)[b]
Previous spontaneous abortion	394 (30%)	68 (28%)[a]	150 (26%)[a]	176 (35.3%)[b]
Previous therapeutic abortion	332 (25%)	83 (34%)[a]	133 (23%)[b]	116 (23%)[b]
Multiple therapeutic abortion	115 (9%)	30 (12%)[a]	39 (7%)[b]	46 (9%)[a,b]
First child	514 (39%)	43 (18%)[a]	269 (47%)[b]	202 (41%)[c]
Previous abuse	151 (12%)	38 (16%)[a]	61 (11%)[b]	52 (11%)[b]

[a,b,c]Letters denote significant differences ($p < 0.05$). Groups with the same letter are not significantly different. Groups with differing letters are significantly different from each other.

reported a wanted or a mistimed pregnancy, women who reported an unwanted pregnancy were significantly more likely to have had a previous preterm birth ($p < 0.0001$). They were also more likely to have had a previous therapeutic (optional) abortion ($p < 0.01$). Further, they were less likely to be having their first child ($p < 0.0001$). Interestingly, 18% of the unwanted group were having their first child.

Psychosocial differences across intention categories

The psychosocial characteristics reflected the ordinal nature of the intention groups (Table 3). Generally, we might have increasing concern for maternal and fetal health as one moves along the continuum from wanted to mistimed to unwanted pregnancies. Women who are trying to get pregnant may be more likely to have considered their preconception health and habits than women in both other categories, and the women whose pregnancies are mistimed may be more likely to adjust their habits in response to their pregnancy than women who do not want to be pregnant at all. We see this ordinal nature of the categories playing out in the psychosocial characteristics as well. Women who reported their pregnancy as wanted have significantly better psychosocial characteristics than women who reported their pregnancy as mistimed, whose characteristics were significantly better than those of women who reported their pregnancy as unwanted (Table 3). It should be noted that although the mean depression score among women who reported their pregnancy as unwanted (18.0) was above the cutoff for clinical depression in the general population (16), the pregnancy cutoff is generally higher due to the physical similarities in some of the symptoms of pregnancy and depression (fatigue,

sleep changes).[30,32,41] Women with wanted pregnancies scored much lower on depression, with a mean score of 12.4, and those in the mistimed category had an intermediate average score of 15.1. Self-efficacy, a measure of a sense of control, was significantly lower in the unwanted group compared to the wanted group, but not statistically different from the mistimed group. Perceived stress was significantly higher in the unwanted group compared to the mistimed and wanted groups and was significantly higher in the the mistimed group than in the wanted group.

Women with unwanted pregnancies had significantly lower levels of social support, as measured by the ISEL checklist. Additionally, women with unwanted pregnancies had statistically significantly higher levels of negative paternal support and statistically significantly lower levels of positive paternal support compared to the other two groups (Table 3).

Multivariate analyses

The ANOVA results provide important insights, but multivariate analysis is required to fully understand membership of intention categories. Analyses controlled for maternal race, maternal age, maternal education, marital status, income, and having three or more children. Table 4 presents the base model, containing only the covariates. Comparing unwanted with wanted pregnancies, the significant predictors were being NHB (OR 4.64, CI 2.48-8.68), being single (OR 2.38, CI 1.44-3.93), higher income (OR 0.40, CI 0.22-0.74), and having three or more children (OR 2.74, CI 1.69-4.44). Predictors varied for the mistimed/wanted comparison. Race dropped significance, but age gained significance. Being in the age

TABLE 3. PSYCHOSOCIAL CHARACTERISTICS ACROSS INTENTION STATUS

	All	Unwanted	Mistimed	Wanted
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Depression	14.5 (10.5)	18.0[a] (11.0)	15.2[b] (10.0)	12.3[c] (10.2)
Self-efficacy	3.3 (0.49)	3.2[a] (0.58)	3.3[a,b] (0.46)	3.4[b] (0.46)
Perceived stress	2.6 (0.74)	2.8[a] (0.72)	2.6[b] (0.70)	2.4[c] (0.76)
Social support	38.3 (7.5)	36.3[a] (8.7)	38.4[b] (7.0)	39.3[c] (7.2)
Positive paternal support	2.5 (0.54)	2.3[a] (0.64)	2.5[b] (0.55)	2.7[c] (0.40)
Negative paternal support	1.13 (0.24)	1.21[a] (0.31)	1.14[b] (0.24)	1.10[c] (0.19)

[a,b,c]Letters indicate significant differences ($p < 0.05$). Groups with the same letter are not significantly different. Groups with differing letters are significantly different from each other.

SD, standard deviation.

TABLE 4. ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS OF INDICATED PREGNANCY INTENTION
COMPARISONS FOR EACH DEMOGRAPHIC VARIABLE

	Unwanted vs. wanted	Mistimed vs. wanted	Unwanted vs. mistimed
Race			
NHW	1.00	1.00	1.00
NHB	4.64 (2.48-8.68)***	1.24 (0.87-1.77)	3.74 (1.98-7.08)***
Age, years			
<20	1.12 (0.61-2.06)	2.66 (1.66-4.27)***	0.42 (0.25-0.72)***
20–24	0.87 (0.56-1.35)	1.82 (1.29-2.57)**	0.48 (0.31-0.72)**
25–29	1.00	1.00	1.00
30–34	1.16 (0.70-1.91)	0.81 (0.54-1.22)	1.44 (0.88-2.36)
≥35	1.33 (0.73-2.44)	0.38 (0.22-0.68)**	3.47 (1.76-6.85)***
Education			
<High school	1.04 (0.62-1.75)	0.90 (0.59-1.39)	1.16 (0.72-1.86)
High school	1.00	1.00	1.00
>High school	1.24 (0.83-1.85)	1.26 (0.91-1.74)	0.98 (0.68-1.42)
Marital status			
Single	2.38 (1.44-3.93)**	1.64 (1.13-2.38)*	1.45 (0.87-2.43)
Married	1.00	1.00	1.00
Yearly household income			
<$20,000	1.27 (0.84-1.91)	0.99 (0.71-1.38)	1.28 (0.88-1.87)
$20,000–$39,999	1.00	1.00	1.00
≥$40,000	0.40 (0.22-0.74)**	0.44 (0.29-0.68)***	0.90 (0.48-1.68)
Parity			
≥3 children	2.74 (1.69-4.44)***	1.24 (0.78-1.98)	2.21 (1.39-3.51)**
<3 children	1.00	1.00	1.00

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

categories of 18–19 and 20–24 made it more likely that one would be in the mistimed group (OR 2.7, CI 1.7-4.3; OR 1.8, CI 1.3-2.6). Conversely, being ≥35 reduced the odds of being in the mistimed group (OR 0.4, CI 0.2-0.7). Being NHB (OR 3.7, CI 2.0-7.1), younger (18–19: OR 0.4, CI 0.3-0.7; 20–24: OR 0.5, CI 0.3-0.7; ≥35: OR 3.5, CI 1.8-6.9), and having three or more children (OR 2.2, CI 1.4-3.5) predicted membership in the unwanted vs. mistimed category.

Before adding the psychosocial health measures to the multivariate, multinomial model for intention status, we present Table 5 showing the distribution of each psychosocial survey score in the sample population of participants reporting all demographic covariates (note, about 10% of participants did not report income and were excluded here). Higher scores on the surveys measuring perceived stress, depression, and negative paternal support are associated with higher risk psychosocial health (i.e. more perceived stress, more depression, and more negative paternal support). Lower scores on the surveys measuring self-efficacy, social support, and positive paternal support are associated with

higher risk psychosocial health (i.e. lower self-efficacy, less social support and less positive paternal support).

Psychosocial variables also predicted intention group membership (Table 6). Table 6 presents the crude, covariate-adjusted, and fully adjusted models. In comparing the unwanted and wanted groups, all psychosocial variables independently significantly distinguished the unwanted and wanted groups. Higher scores on depression, perceived stress, and negative paternal support increased the likelihood that one would be in the unwanted group. Conversely, higher scores on social support and positive paternal support decreased the likelihood that one would be in the unwanted group. The covariates in the base model remained similar with the addition of each psychosocial variable. When covariates are added to the model, higher scores on depression, perceived stress, and negative paternal support predicted being in the unwanted as compared to the wanted group. In the fully adjusted model, which includes the covariates as well as all psychosocial measures, higher levels of perceived stress significantly increased the likelihood (OR 1.7, CI 1.1-

TABLE 5. DISTRIBUTION OF PSYCHOSOCIAL CHARACTERISTICS SCORES IN STUDY POPULATION
WITH NO MISSING COVARIATES

	n[a]	Mean	SD	Minimum	Maximum	25th percentile	75th percentile
Depression (CES-D)	1202	14.6	10.5	0.0	58.0	6.0	20.0
Self-efficacy	1276	3.3	0.5	1.0	4.0	3.0	3.7
Perceived stress	1291	2.6	0.7	1.0	4.9	2.0	3.1
Social support	1285	38.3	7.5	7.0	48.0	34.0	44.0
Positive paternal support	1289	2.5	0.5	1.0	3.0	2.2	3.0
Negative paternal support	1297	1.1	0.2	1.0	3.0	1.0	1.2

[a]The number of observations varies due to incomplete survey responses that prevented scoring.
CES-D, Centers for Epidemiologic Studies Depression Scale.

TABLE 6. CRUDE, COVARIATE-ADJUSTED, AND FULLY ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS OF INDICATED INTENTION STATUS COMPARISONS FOR EACH PSYCHOSOCIAL CHARACTERISTIC

	Unwanted vs. wanted[a]			Mistimed vs. wanted[a]			Unwanted vs. mistimed[b]		
	Crude	Covariate-adjusted[c]	Fully adjusted[d]	Crude	Covariate-adjusted[c]	Fully adjusted[d]	Crude	Covariate-adjusted[c]	Fully adjusted[d]
Depression (CES-D)	2.1** (1.7-2.6)	1.5** (1.2-2.0)	0.9 (0.64-1.4)	1.5** (1.3-1.8)	1.2 (0.96-1.4)	0.9 (0.68-1.3)	1.4** (1.1-1.7)	1.3* (1.1-1.6)	1.0 (0.71-1.4)
Self-efficacy	0.7** (0.56-0.86)	0.9 (0.70-1.1)	1.4 (0.98-1.9)	0.9 (0.77-1.1)	1.0 (0.85-1.3)	1.3 (0.95-1.6)	0.8* (0.61-0.93)	0.9 (0.7-1.1)	1.1 (0.79-1.5)
Perceived stress	2.3** (1.8-2.9)	1.7** (1.3-2.3)	1.7* (1.1-2.7)	1.6** (1.4-2.0)	1.3** (1.1-1.6)	1.4* (1.0-2.0)	1.4** (1.1-1.8)	1.3* (1.0-1.7)	1.2 (0.80-1.8)
Social support	0.6** (0.49-0.73)	0.7** (0.57-0.88)	0.9 (0.67-1.3)	0.8* (0.71-0.99)	0.9 (0.75-1.1)	1.0 (0.77-1.3)	0.7** (0.59-0.86)	0.8* (0.64-0.96)	0.9 (0.68-1.3)
Positive paternal support	0.3** (0.24-0.40)	0.4** (0.34-0.58)	0.5** (0.39-0.75)	0.5** (0.39-0.61)	0.6** (0.51-0.81)	0.7* (0.51-0.92)	0.6** (0.52-0.77)	0.7** (0.56-0.86)	0.8 (0.60-1.0)
Negative paternal support	1.4** (1.2-1.6)	1.3** (1.1-1.5)	1.1 (0.93-1.3)	1.2** (1.1-1.3)	1.1 (0.97-1.2)	1.0 (0.85-1.2)	1.2** (1.1-1.3)	1.2** (1.0-1.3)	1.1 (0.96-1.3)

The presented odds ratios are based on an increase in the psychosocial measure the magnitude of the interquartile range of scores in the dataset.

[a]Wanted is the referent.

[b]Mistimed is the referent.

[c]Covariate-adjusted odds ratios are adjusted for race, age, education, marital status, income, more than three children.

[d]Fully adjusted odds ratios are adjusted for all covariates and all survey scores.

$*p < 0.05$; $**p < 0.01$.

2.7), and higher levels of positive parental support significantly reduced the likelihood (OR 0.5, CI 0.4-0.8) of being in the unwanted group (as compared to wanted).

When comparing the mistimed and wanted groups, all variables except self-efficacy predicted group membership, with higher scores on depression, perceived stress, and negative paternal support increasing the likelihood and higher scores on social support and positive paternal support decreasing the likelihood of being in the mistimed vs. the wanted group. Including the covariates attenuated the relationships, leaving perceived stress (OR 1.3, CI 1.1-1.6) and positive paternal support (OR 0.7, CI 0.5-0.9) significantly differentiating the groups. The fully adjusted model follows the same pattern, with perceived stress increasing and positive paternal support decreasing the odds of being in the mistimed group (compared to the wanted).

The unwanted and mistimed groups differed on all psychosocial characteristics in the unadjusted models. When the covariates are added to the model, higher scores on depression, perceived stress, and negative paternal support significantly increase the likelihood and higher scores on social support and positive paternal support significantly decrease the likelihood that one is in the unwanted as compared to the mistimed group. In the fully adjusted model, the relationships are attenuated.

Pregnancy outcome differences across intention categories

ANOVA analyses of the three groups indicate statistically significant differences in birth weight and gestational age. In pairwise comparisons, mean birth weight was significantly lower in the unwanted group compared to the other two groups (unwanted = 3000 g; mistimed = 3083 g; wanted = 3144 g, $p < 0.05$). Similarly, mean gestational age was significantly lower for the unwanted group (unwanted = 37.7; mistimed = 38.1; wanted = 38.1, $p < 0.05$). The disparity increased even more when dichotomizing on spontaneous delivery rather than clinically indicated induction at < 32 weeks (unwanted, 4%; mistimed, 1%; wanted, 1%, $p < 0.05$). These statistical differences were attenuated in multivariate analyses, with the covariates accounting for differences in birth weight and gestational age.

Discussion

This analysis examined the maternal and psychosocial contributors to intention status in an ongoing prospective cohort study. In our sample, the unwanted and mistimed pregnancies were similar demographically but markedly different on psychosocial health measures and maternal characteristics. Unwanted pregnancies also differed from wanted pregnancies demographically and psychosocially. The mistimed and wanted groups differed in both areas as well.

The psychosocial differences among the groups merit further elucidation. Our findings complement previous research that psychosocial health differs across pregnancy intention groups.[16,30–33] Similar to earlier research, our unwanted group has a risky profile, experiencing high levels of depression, perceived stress, and negative paternal support along with low levels of self-efficacy and support, both general and

paternal. Looking holistically at this psychosocial profile and the at-risk demographic profile, these women are at substantial risk. It is unlikely that these profiles will change when the pregnancy is over; rather, these risks are often long term and not easily ameliorated. Especially important is the finding that these women report high levels of perceived stress, with corresponding low levels of paternal support, even after controlling for all other psychosocial and demographic covariates. Further, although the relationships between intention and birth weight and gestational age are attenuated when controlling for covariates, women with unwanted pregnancies have mean lower birth weights and earlier deliveries. It is important to explore why some women have repeated unwanted pregnancies. Over one third of the women in the unwanted category had previously had an elective abortion, with 12% having had more than one abortion. Our data indicate that serial unwanted pregnancies constitute a significant public health problem. Women who already have three or more children at home may be at particular risk for contextual stress with a lack of appropriate support, potentially impacting maternal mental and physical health as well as long-term parenting ability.

Another interesting subset of women who reported an unwanted pregnancy is the 18% who are pregnant with their first child. Many would expect that these women would report that their pregnancy is mistimed rather than unwanted. Further elucidation of these women's context and motivation would be worthwhile. Even within the same intention category, women may differ dramatically.

We argue that the three categories of intention—unwanted, mistimed, and wanted—more appropriately identify intention phenotypes as compared to the more traditional intended vs. unintended dichotomization. A woman who becomes pregnant earlier than expected may react and behave differently from either a woman who becomes pregnant when planned or one who does not want the pregnancy at all. Further, the women who reported a wanted pregnancy may have already begun preparing for the pregnancy through recommended lifestyle changes. Our results agree with previous research that indicates that combining the unwanted and mistimed groups masks important differences between the groups,[11,13,15,16,24,28,30,42] with clinical implications in needs assessment and ancillary service delivery, such as social work.

Our study has several limitations. Self-reported pregnancy intention has inherent issues. The acceptance of admitting an unwanted or mistimed pregnancy may vary by culture. We are limited in our ability to address this, as our sample is predominantly NHB. In addition, given that the pregnancy intention question is asked at the time of enrollment, which is between 18 and 28 weeks of pregnancy, when women have already chosen to carry their pregnancies to term, self-reports may not be wholly reliable. Pregnancy intention has the potential to change depending on when the woman is asked.[21] We also may negatively bias our estimate of unwanted pregnancies because we fail to capture the women who decide to terminate the pregnancy before 18 weeks as well as limit enrollment to women who are ≤28 weeks pregnant, thereby eliminating women with unwanted pregnancies who may be more likely to initiate prenatal care late. We note, however, that the CDC's intention questionnaire within PRAMS, an important source of information on pregnancy intention in the United States, is implemented after delivery. Our sample is limited to women >18 years of age, eliminating many teen pregnancies, which are a high-risk group for mistimed pregnancies. Considering 62% of our participants indicated an unintended pregnancy, the potential negative bias indicates that unintended pregnancy is a serious public health concern.

Future research should explore the distinction between unwanted and mistimed pregnancies in other cohorts to confirm the results presented here. In addition, research is needed to understand and prevent the high rates of unwanted and mistimed pregnancies, with a particular emphasis on unwanted pregnancies, given the greater risk these women pose. Additional barriers to pregnancy planning, beyond access to contraceptive services, should be identified so public health systems can effectively work on breaking down these barriers. Given the significant numbers of unwanted pregnancies that occur in multiparas (81% of the women in our unwanted group), intervention research aimed at high-risk women in the immediate postnatal period appears warranted.

Additional studies are needed that refine the measurement of pregnancy intention. Ideally, the question would be asked at pregnancy confirmation, reducing the potential for recall bias. Quantifying the degree of mistiming of a pregnancy would be helpful, as a pregnancy that is 1 year earlier than desired is inherently different from one that is 10 years early. Asking women and their partners about the dimensions of intention (trying to get pregnant, happiness regarding pregnancy)[25] would clarify what it means for a pregnancy to be intended or unintended.

Conclusions

Pregnancy intention is an important indicator of a woman's readiness to bear a child, her mental and physical health, and her sociodemographic context. Although preventing unintended pregnancies remains an important public health objective, understanding the contributors to unwanted and mistimed pregnancies elucidates large concurrent risk factors. In our cohort, women who report unwanted pregnancies, especially those who have recurring unwanted pregnancies, appear to be the most distinct and at highest risk. Having an unwanted pregnancy does not mean these women will not want or love their infant.[43] However, knowing the demographic and psychosocial risks, clinicians could make referrals for services so these women get the support they need to reduce stress and enhance resiliency. Preventing mistimed and unwanted pregnancies is important; further, in clinical practice, identifying the riskiest pregnancies and determining appropriate intervention strategies for the current pregnancy, subsequent interconceptual care, and maternal and child health are paramount.

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